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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/937,653	01/18/2002	Giovanni Brandi	05788.0183	5121

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EXAMINER

ARTMAN, THOMAS R

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 09/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/937,653

Applicant(s)

BRANDI ET AL.

Examiner

Thomas R Artman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-58 is/are pending in the application.
- 4a) Of the above claim(s) 30-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40-44 and 48-58 is/are rejected.
- 7) ☒ Claim(s) 45-47 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group II in Paper No. 11 is acknowledged. The traversal is on the ground(s) that there was insufficient proof of burden upon the examiner due to common classification of the claim groups. This is not found persuasive because the differences in classification and scope between the two groups are significant:

Group I, claims 30-39, drawn to a method of manufacturing an optical cable, corresponds to US class 65, subclasses 430+, which correspond to IPC7 subclasses C03B and C03C.

Group II, claims 40-58, drawn to an optical cable, corresponds to US class 385, subclasses 100-114, which correspond to IPC7 subclass G02B, group 6/44.

The searches required for an optical fiber with particular properties are divergent, and therefore the burden of examination is present.

The requirement is still deemed proper and is therefore made FINAL.

Drawings

The drawings are objected to because the labels of the axes in Fig.16 are not in the English language. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 40, 44 and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergano (US 5,440,659).

Regarding claim 40, Bergano discloses an optical fiber cable (Fig.1 and described at least in col.3, lines 3-6 and lines 29-48), including:

- 1) at least one optical fiber (item 20),
- 2) a substantially strand-like central member (item 18),
- 3) a layer of polymer material (item 22) which is substantially devoid of discontinuities and incorporates the central element and the at least one optical fiber,
- 4) the at least one optical fiber is arranged along an open helix trajectory, and
- 5) the PMD in the fiber is less than 110% of the PMD in a non-cabled optical fiber (col.1, line 57, to col.2, line 2).

With respect to claim 44, Bergano discloses 6 optical fibers, which falls within the specified range of 2 to 24 optical fibers.

With respect to claim 49, Bergano's cable has a plurality of optical fibers arranged in a ring equidistant from each other and at a common distance from an axis of the cable.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 50 and 53-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano.

Regarding claims 50 and 53-57, the optimization and determination of suitable values/ranges for:

- 1) the thickness of the polymer layer (claim 53),
- 2) the diameter of the central member (claim 54),
- 3) the radius of the ring of optical fibers (claim 50),
- 4) the diameter of the optical fiber cable (claims 55-56), and
- 5) the range of mechanical properties for the polymer layer,

fall within the scope of customary practice of persons with ordinary skill in the art, particularly in the absence of any unexpected results or criticality.

Regarding claim 58, the recited polymers are well known for use in optical fiber cable construction and their selection falls within common practice to those skilled in the art, lacking criticality or unexpected results of their use.

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Claims 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano and in view of Norman (US 6,035,086).

Regarding both claims, Bergano does not specifically disclose torsion ranges of 0.05 to 1.5 turns/m, or more specifically, 0.1 to 1 turns/m. However, Bergano teaches that applying any amount of torsional strain (twist) to the fiber improves the PMD characteristics of the fiber, and cites an optimum range of twists to be about 2-4 turns/m (col.6, line 63, to col.7, line 14), where significant improvement in performance is obtained up to 2 turns/m and any more than 4 turns/m causes too much losses in the fiber due to excessive strain.

Norman also teaches of various design concerns regarding the improvement of PMD characteristics in optical fiber cables. Norman states, in col.2, lines 1-6, that the fibers can be twisted one full turn every 1 to 10 meters. This range contains values which fall within the ranges claimed in claims 41 and 42.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a torsional strain on Bergano's fibers within the range of 0.1 to 1 turns per meter since improved PMD characteristics will be attained without causing unacceptable optical losses.

Claims 43 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano and in view of Hart (US 5,418,881).

Regarding claim 43, Bergano does not disclose that the net torsional strain is zero.

Hart teaches, in col.3, lines 6-50, that an inverted relationship, where the twists alternate in direction, provides a more efficient method for minimizing PMD dispersion in an optical fiber.

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As further stated, in col.4, line 58, to col.5, line 4, Hart teaches that essentially zero net strain is necessary in order to minimize optical transmission losses. In this way, the local torsional strain along the length of the fiber is non-zero in order to improve the PMD characteristics while providing an overall (net) strain of zero in order to minimize optical transmission losses.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bergano's optical fiber cable to have essentially zero net torsion through the use of the inverted twisting arrangement as taught by Hart. In this way, the higher strain that causes optical losses can be more easily averted while improving the PMD characteristics of the optical fiber cable.

Regarding claim 48, Bergano does not disclose an inversion pitch, particularly within the range of 0.5 to 5 meters.

Hart teaches, in col.3, lines 6-50, that non-uniform torsional strain has advantages for efficient minimization of PMD distortion in the fiber (improved PMD characteristics). Specifically, Hart teaches that positive and negative twisting (inverted pattern) is more efficient without causing high strains in the fiber that causes optical transmission loss, particularly with an inverted pitch of around 4m.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bergano's pitch to an inverted pitch within the range of 0.5 to 5m as taught by Hart in order to improve the efficiency of reducing PMD distortion in the optical signal. In this way, Bergano's design can further avoid the known optical losses caused by the strain from

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using high turns/m (which also correspond to high pitch) while improving the PMD characteristics of the fiber.

Claims 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano and in view of Spooner (US 6,363,192).

Regarding claim 51, Bergano does not disclose the use of two rings of optical fibers.

Spooner teaches the use of multiple evenly-spaced rings of optical fibers at different distances from a common axis.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bergano's cable to include an additional ring of optical fibers such that more fibers can be carried in the same cable. This provides for a more compact transmission line.

With respect to claim 52, the optimization and determination of suitable radii of the two rings of fibers fall within the scope of customary practice of persons with ordinary skill in the art, particularly in the absence of any unexpected results or criticality.

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Allowable Subject Matter

Claims 45-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art made of record, alone or in combination, does not teach or reasonably suggest the additional limitation of having a maximum torsion angle less than the maximum winding angle as claimed in claim 45. Bergano specifically states that the winding angle and the torsion angle are the same (col.4, lines 1-24). The remaining prior art do not specify such parameters.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (703) 305-0203. The examiner can normally be reached on 8am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

Thomas R. Artman
Patent Examiner
August 21, 2003



DAVID V. BRUCE
PRIMARY EXAMINER